

**Biological Assessment for Threatened and Endangered Plant Species
Northern Utah Aspen Restoration Project
Roosevelt District, Ashley National Forest**

Current management direction for threatened and endangered species as contained in the Endangered Species Act of 1973 includes: "... all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act."

U.S. Department of Interior (1997) listed threatened and endangered plant species by state. Those listed for Utah were considered in this BA. Within Utah, distribution of these species and those proposed for listing and their habitat have been determined by extensive botanical survey and herbarium search.

Survey for Plants has been intensive in the past few decades in the Intermountain Region including Utah, Uinta Basin, Uinta Mountains and specifically the Ashley National Forest. Many thousands of plant collections housed at the major and minor herbaria of Utah and at other institutions including New York Botanical Garden are the basis for geographic, elevation, and habitat information given in Atwood et al. (1991), Barneby (1984); Cronquist (1994); Cronquist et al (1972, 1977, 1984, 1997), Holmgren et al. (2005), Welsh et al. (2003), (Goodrich and Neese 1986), and Goodrich and Huber (2015). The work of Ramsey and Shultz (2004) clearly demonstrates a high density of botanical collections in Utah. This work based on about 400,000 specimens (as of 1988) for Utah shows the area included in the Ashley National Forest to be comparatively densely collected. In the years since 1988 thousands of additional specimens have been added to Utah collections. These works of the past 40 years have been a driving force for extensive botanical work. Although most of the above cited works are general floras, they include plants listed as Threatened, Endangered, and Sensitive.

Specific works for narrow endemic and other plants that have been listed as Threatened, Endangered, Sensitive, or considered for such status include: Farrar 2002, Farrar 2004, Fertig 1997, Fertig 2000, Franklin 1988, Franklin 1989, Franklin 1990, Franklin 1991, Franklin 1992, Heil and Melton 1995a, Heil and Melton 1995b, Heil and Melton 1995c, Welsh and Neese 1979, and Welsh and Thorn 1979. The work of Refsdal (1996) for southwest Wyoming and adjacent northeast Utah includes parts of the Ashley National Forest. Some of these papers deal with plants outside but adjacent to the Ashley National Forest. However, they are relevant in that they help verify absence of some plants from the National Forest.

The literature cited above coupled with continuing botanical surveys on the Ashley National Forest constitute the best available science.

Threatened and Endangered Plants

Based on this information above, the only Threatened and Endangered plant to be expected on the Ashley National Forest is *Spiranthes diluvialis*. All other Threatened and Endangered plant species are well removed from the National Forest in distance and/or their habitat is not found on the National Forest.

Franklin (1992) has completed a detailed report for *Spiranthes diluvialis*. Based on collections from the drainages that originate from the Uinta Mountains, *Spiranthes diluvialis* is not found nor is it expected on the National Forest. *Spiranthes diluvialis* has been found in some of these drainages below the National Forest Boundary. Collections from the National Forest were sent to Charles J. Sheviak at New York State Museum, Albany, New York for identification. All specimens sent to him from the National Forest were identified as *S. romanzoffiana*. One population of *Spiranthes diluvialis* has been found on the Ashley National Forest along the Green River between Little Hole and the National Forest Boundary.

Additionally, Franklin (1992) noted that *Spiranthes diluvialis* seems generally intolerant of shade, preferring open, forb-dominated sites. Intolerance of shade strongly indicates that the plant does not favor aspen dominant communities.

Spiranthes diluvialis has been found in the Rock Creek, Lake Fork, Uinta, Whiterocks, and Yellowstone River drainages below the National Forest, but has not been found and is not expected to be found above the boundary. There is no potential habitat for the species within aspen communities. Based on this, no effect to Threatened or Endangered plant species or their habitat is determined for activities of the proposed action. The best available science indicates that the Northern Utah Aspen Restoration Project is expected to have "No Effect" to *Spiranthes diluvialis* plants or populations.

Prepared by: /S/ Allen A Huber Date: 12 June 2019
Ecologist

**Biological Evaluation for Sensitive Plant Species
Northern Utah Aspen Restoration Project
Vernal District, Ashley National Forest**

This biological evaluation addresses the potential effects of the proposed action on plants listed as sensitive for the Ashley National Forest. The proposed action is defined in the project folder.

For sensitive species, current policy in the Forest Service Manual (FSM 2670.3) includes the following: "As part of the NEPA process, review programs and activities, through a biological evaluation, to determine their consistency with conservation strategies or their potential effect on sensitive species if no conservation strategy exists."

A list (dated March 30, 2010) of sensitive species was prepared by Region 4 of the Forest Service. Distribution of sensitive plant species and their habitat is provided in the literature cited in the Biological Assessment for Threatened and Endangered Plant Species for this proposed action. This includes various reports on individual species prepared by Franklin (1989, 1990a, 1990b, 1992a, 1992b) and by Fertig (1995). Studies for some rare plants not on the sensitive plant list are also listed in the reference section. These studies support the exclusion of some rare plants that might be considered for sensitive status on a National Forest List. They also indicate the intensity of study of rare plants in the Uinta Basin area.

The above cited references and references cited in the biological evaluation for Threatened and Endangered plants species and ongoing botanical surveys on the Ashley National Forest constitute best available science. Literature and surveys are consistent in defining distribution of endemic plants (these often listed as sensitive, threatened, and endangered) to be confined to specific geologic strata or other specific habitat. They are often found on barrens and semi-barrens of inherently high disturbance. This is well demonstrated in the photographs and notes of habitat provided in Atwood et al. (1991). Potential habitat for these plants is therefore quite predictable. Surveys for these plants are quite effective when confined to specific geology or other features. Random surveys for these plants over wide areas are not needed to delineate distribution or habitat of these species.

The narrow and predictable distribution of most of these plants is verified in a large sample set of over 21,000 monitoring sites on the Ashley National Forest that includes numerous plant communities. Plants listed as sensitive are found in comparatively few of these numerous sites. Most of the sites where these plants are found were specifically selected to monitor plants listed as sensitive.

In addition to monitoring sites, general surveys for plants have been conducted across the National Forest. The work of Ramsey and Shultz (2004) clearly demonstrates a high density of botanical collections in Utah. This work based on about 400,000 specimens (as of 1988) shows the area included in the Ashley National Forest to be comparatively densely collected. In the years since 1988 thousands of additional specimens have been

added to Utah collections. Many of these have come from the Ashley National Forest and adjacent areas. Collections housed in Utah herbaria and other herbaria and publications cited above are the basis for an inventory of sensitive plants of the Ashley National Forest.

Ecological Units including Landtype Associations and Landtypes are outlined in the Land Systems Inventory of the Ashley National Forest. Presence of Sensitive Plants has been correlated with Ecological Units at the Landtype Association and/or Landtype level (Appendix 1). Distribution of sensitive plants in relation to distribution and habitat of the propose action is discussed below.

Although aspen communities are found in some of the landtypes associated with sensitive plant species, only *Botrychium lineare* (Avintaquin Canyon Landtype Association) is associated with aspen community types. All other Ashley National Forest sensitive plant species have no association with aspen communities (refer to sensitive plant habitat descriptions in Appendix A). *Botrychium lineare* is documented from a single collection (R. S. Ferris sn of 5 July 1947) on the Ashley National Forest. Label information from that collection places the plant on or near to the Ashley National Forest boundary at the summit of Indian Canyon, Duchesne-Price Road at 9,100 foot elevation. The site location described above was visited by S. Goodrich and A. Huber in 2004 and again by A. Huber in 2017 (Ecologists, Ashley National Forest). The site was also visited in 2003 by Don Farrar (Personal communication to Teresa Prendusi of 20 February 2004 on file as Supervisors Office, Ashley National Forest, Vernal, UT). No plants of slender moonwort were found during those visits. Although *Botrychium lineare* was not found during those surveys, additional plant surveys would be necessary before aspen restoration actions could be implemented in that area.

Based on this information, the actions associated with the Northern Utah Aspen Restoration Project is expected to have no "No Impact" to sensitive plants, except possibly for *Botrychium lineare*. Although the plant has not been found from the site location since 1947, actions associated with the Northern Utah Aspen Restoration Project "may impact individuals but not likely to cause a trend to federal listing or a loss of viability." Best available science indicates this determination is made with high level of certainty.

Prepared by: /S/ Allen A Huber Date: 12 June 2019
Ecologist

References

- Albee, B. J.; Shultz, L. M.; Goodrich, S. 1988. Atlas of the vascular plants of Utah. Occasional Publication No. 7. Salt Lake City, Utah. Utah Museum of Natural History. Xx p.
- Atwood, Duane; Holland, Jim; Bolander, Ron; et al. 1991. Utah threatened, endangered, and sensitive plant field guide. Ogden, UT. U.S. Department of Agriculture, Forest Service, Intermountain Region. 1 vol.
- Barneby, R. 1989. Fabales. Intermountain flora Vol. 3B: New York Botanical Garden, Bronx, New York. 279 p.
- Brown, G. D. 2006. An alpine plant community classification for the Uinta Mountains, Utah. Ogden, UT. U.S. Department of Agriculture, Forest Service, Intermountain Region. Ashley and Wasatch-Cache National Forests. 140 p.
- Cronquist, A. 1994. Asterales. Intermountain flora Vol. 5. Bronx, NY: The New York Botanical Garden. 496 p.
- Cronquist, A.; Holmgren, A. H.; Holmgren, N. H.; Reveal, J. L. 1972. The vascular cryptogams and the gymnosperms. Intermountain flora Vol. 1. New York. Hafner Publishing Company. 270 p.
- Cronquist, A.; Holmgren, A. H.; Holmgren, N. H.; Reveal, J. L.; Holmgren, P. K. 1977. The monocotyledons. Intermountain flora Vol. 6. New York. Columbia University Press. 584 p.
- Cronquist, A.; Holmgren, A. H.; Holmgren, N. H.; Reveal, J. L.; Holmgren, P. K. 1984. Subclass Asteridae (except Asteraceae). Intermountain flora Vol. 4. Bronx, New York. The New York Botanical Garden. 573 p.
- Cronquist, A.; Holmgren, N. H.; Holmgren, P. K. 1997. Subclass Rosidae (except Fabales). Intermountain Flora Vol. 3A. The New York Botanical Garden. 446 p.
- Farrar, D. R. 2002. Systematics of western moonworts *Botrychium* subgenus *Botrychium*. Ames, Iowa, Department of Botany, Iowa State University. 26 p.
- Farrar, D. R. 2004. Personal correspondence to Teresa Prendusi of 20 Feb. 2004.
- Fertig, W. 1995. Status report on *Thelesperma caespitosum* in southwestern Wyoming. Cooperative Agreement # K910-A4-0011. Laramie, WY: Wyoming Natural Diversity Data Base. 45 p.
- Fertig, W. 1997. Wyoming plant and animal species of special concern. Laramie, WY: Wyoming Natural Diversity Database. 32 p.
- Fertig, W. 1999. Updated status report on Green River greenthread (*Thelesperma caespitosum*) in southwestern Wyoming. Wyoming Natural Diversity Database, University of Wyoming. 23 p.
- Fertig, W. 2000. Status of plant species of special concern in US Forest Service Region 4 in Wyoming. Laramie, WY: Wyoming Natural Diversity Database. 74 p.
- Franklin, M. A. "Ben" 1988. Report for sensitive plant inventory project Ashley National Forest – Target species: *Oenothera acutissima*. Salt Lake City, UT: The Nature Conservancy/Utah Natural Heritage Program. 7 p. with other pages of maps, photos, and data form
- Franklin, M. A. "Ben". 1989. Target species: *Erigeron untermannii* Welsh & Goodrich (Untermann daisy). Report for 1990 Challenge Cost-share Project Ashley

- National Forest. Salt Lake City, UT. Utah Natural Heritage Program. 9 p. with appendices.
- Franklin, M. A. "Ben". 1990a. Target species: *Cypripedium fasciculatum*. Report for 1990 Challenge Cost-share Project Ashley National Forest. Salt Lake City, UT. Utah Natural Heritage Program. 10 p. with appendices.
- Franklin, M. A. "Ben". 1990b. Report for 1990 challenge cost-share project, Wasatch-Cache National Forest, Target species: *Parrya rydbergii* Botsch. (Rydberg parrya), *Papaver radiculatum pygmaeum* Rydb. (Welsh) (arctic poppy), *Penstemon uintahensis* Pennell (Uinta penstemon). Salt Lake City, UT: Utah Natural Heritage Program, Utah Department of Natural Resources. 10 p. with appendices 1-5.
- Franklin, M. A. "Ben". 1991. Target species: *Penstemon acaulis*. Report for 1992 Challenge Cost-share Project Ashley National Forest. Salt Lake City, UT. Utah Natural Heritage Program. 11 p. with appendices A-H.
- Franklin, M.A. "Ben". 1992. Ute ladies'-tresses (*Spiranthes diluvialis* Sheviak). Report for 1992 Joint Challenge Cost Share Project, Ashley National Forest and Section Six Agreement, U.S. Fish and Wildlife Service. Salt Lake City, UT: Utah Department of Natural Resources, Utah Natural Heritage Program. 22 p. with appendices.
- Goodrich, Sherel; Neese, Elizabeth. 1986. Uinta Basin Flora. Ogden, UT. U.S. Department of Agriculture, Forest Service, Region Four. 320 p.
- Goodrich, Sherel, Huber, Allen A. 2015. Uinta Flora. Ogden, UT. U.S. Department of Agriculture, Forest Service, Region Four. 314 p.
- Graham, E. H. 1937. Botanical studies in the Uinta Basin of Utah and Colorado. *Annals of the Carnegie Museum*. 26: 232 p.
- Heil, K. D.; Melton, B. 1995a. Status report of *Astragalus hamiltonii* C. L. Porter.
- Heil, K. D.; Melton, B. 1995b. Status report for *Penstemon flowersii* Neese & Welsh.
- Heil, K. D.; Melton, B. 1995c. Status report of *Penstemon goodrichii*. N. Holmgren.
- Holmgren, N. H., Holmgren, P. K., Cronquist, A. 2005. Intermountain flora vol. 2, part B. Bronx, NY: The New York botanical Garden. 448 p.
- Huber, A. A. 1995. A comparative floristic study of limestone and principally quartzite substrates of the Uinta Mountains, Utah. Thesis. Provo, UT: Brigham Young University. 359 p.
- Ramsey, D. R.; Shultz, L. 2004. Evaluating the geographic distribution of plants in Utah from the atlas of vascular plants of Utah. *Western North American Naturalist*. 64: 421-432.
- Refsdal, C. H. 1996. A general floristic inventory of southwest Wyoming and adjacent northeast Utah 1994, 1995. Laramie, WY: Rocky Mountain Herbarium, Department of Botany, University of Wyoming. 309 p.
- South Boulder Creek Management Area Chapter 7, Vegetation. This was once available online, but apparently not currently available. A paper copy is included in the reference file.
- USDA, NRCS. 2009. The PLANTS Database (<http://plants.usda.gov>, 16 March 2009). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
- Welsh, S.L.; Atwood, N. D.; Goodrich, S.; Higgins, L. C. 2015. A Utah flora 5th ed., revised. Provo, UT: Brigham Young University, Print Services. 987 p.

- Welsh, S. L.; Neese, E. 1979. Inventory of phosphate areas of the Ashley National Forest for candidate proposed threatened and endangered plant species, Daggett, Uintah, and Duchesne Counties, Utah. Orem, UT: Endangered Plant Studies, Inc.
- Welsh, S. L.; Thorne, K. H. 1979. Illustrated manual of proposed endangered and threatened plants of Utah. Provo, UT: Herbarium, Brigham Young University, Provo, Utah.

Appendix 1

Sensitive Plant Species by Landtype Association and Landtype Ashley National Forest

March 2010

Taxon	Landtype Association (alpha) and Landtype (numeric)
<i>Aquilegia grahamii</i> *	SC5
<i>Artemisia campestris</i> var. <i>petiolata</i> *	GC10, GC12, NF13
<i>Botrychium lineare</i> *	AC210
<i>Cypripedium fasciculatum</i>	PP4, PP5, TS1, TS2, TS4, TS7
<i>Draba apiculata</i>	UB2, UB3
<i>Papaver radicum</i>	UB1, UB2
<i>Penstemon acaulis</i>	NF7, AF1
<i>Erigeron untermannii</i> *	AP110, AP115
<i>Mentzelia goodrichii</i> *	AP110, AP115
<i>Thelesperma caespitosum</i> *	AP110, AP115 AP135, AP155 ¹ GR100
Common names are listed below in same order as above	
Graham columbine	
Field sagewort	
Narrow grapefern or moonwort	
Clustered lady's slipper	
Beavertip draba	
Rooted poppy	
Stemless beardtongue	
Untermann daisy, Indian Canyon fleabane	
Goodrich blazingstar	
Low greenthread	

*Described as new to science within the past 30 years. Six of the 10 listed species indicted as comparatively new discoveries is a reflection of the intensity of botanical work of the past 30 or so years.

¹ *Erigeron untermannii* is restricted to semi-barren ridge tops on AP155.

About 20 of over 100 landtypes account for over 98% of sensitive plant occurrences on the Uinta Mountains Section and Tavaputs Plateau Section on the Ashley National Forest. The relationship between sensitive plants and ecological units are based on botanical work that has spanned nearly 100 years with extensive and intensive work being conducted in the last 30 years.

Key to codes of Landtype Associations for the Uinta Mountains Section

Landtype Association Acronym	Landtype Name
AF	Antelope Flat
GC	Glacial Canyon
NF	North Flank
PP	Parks Plateau
SC	Stream Canyon
TS	Trout Slope
UB	Uinta Bollie
AP	Anthro Plateau
GR	Green River Basin
AC	Avintaquin Canyon

Threatened Plant Species

Spiranthes diluvialis Sheviak (Ute ladies tresses)

DISTRIBUTION ON THE FOREST: Found in an inventory sponsored by National Park Service at 4 locations on the National Forest along the Green River between Little Hole and downstream to the Forest Boundary. It is known from below the National Forest Boundary along the Green River. It is also known from along the rivers of the south slope of the Uinta Mountains including the Yellowstone, Uinta, Lake Fork, Whiterocks, and Rock Creek Rivers. However in a detailed study of this plant both on and off the Forest in this area, Ute ladies tresses was not found on National Forest Lands. This study including collecting specimens from the Forest and from below the Forest. All specimens from the Forest were identified as hooded ladies tresses (*Spiranthes romanzoffiana* Cham.). Specimens of Ute ladies tresses were found from below the National Forest Boundary only (Franklin 1992) **TOTAL KNOWN RANGE:** Several Western States. **HABITAT ON THE FOREST:** Flood plain and other riparian habitats. **SURVEYS:** Much of potential habitat on the Ashley National Forest has been surveyed. **REACTION TO DISTURBANCE:** Ute ladies tresses is known to colonize highly disturbed sites including gravel pits and irrigation ditches. Competition from aggressive graminoids and willows is indicated to be a major reducing factor for this plant. For this reason fire can be expected to have a positive influence where it reduced taller species including shrubs and trees. Seasonal livestock grazing that reduces graminoid competition is indicated to be a tool of management (South Boulder Creek Management Area Chapter 7, Vegetation www.ci.boulder.co.us/openspace/planning/sbc/InventoryReport/sbcch7.htm). **OTHER NOTES:** Specimens of *Spiranthes romanzoffiana* from the National Forest have been collected from many locations. Landtype Associations represented in these collections include Glacial Bottom, Alpine Moraine, and Greendale Plateau (Goodrich 25214, 15954 BRY). The general collections of *S. romanzoffiana* from the Forest supports a conclusion of the absence of *S. diluvialis*.

Sensitive Plant Species

Aquilegia grahamii Welsh & Goodrich (Graham columbine)

Distribution on The Forest: Stream Canyon Landtype Association in Big Brush Creek Canyon, Little Brush Creek Canyon, Hole In The Wall Canyon, Uintah County, Utah.

Total Known Range: Same canyons as above. Similar plants that look like this taxon are found in the deep sandstone canyons of Dinosaur National Monument.

Habitat on The Forest: Weber Sandstone. Cliffs, ledges, and sandy drip line of wet cliffs and ledges.

Surveys: Much of potential habitat on the Forest has been surveyed by Huber (1995) and other Forest Service Ecologists. Some very inaccessible populations are likely yet to be found.

Reaction to Disturbance: unknown.

Other Notes: This species is very well protected by its habitat from livestock that are permitted in the area. Wild ungulates seem to make very little use of the plant. For the most part it is out of reach of ungulates as it is most common on cliff faces or otherwise very rocky areas. Populations on the forest appear to be at levels consistent with the potential habitat. Recreational use of cliffs and other habitat occupied by this plant is low at present and for the foreseeable future.

Management Implications: Populations on the Ashley National Forest appear to be stable and secure due to the habitat.

Artemisia campestris var. *petiolata* Welsh (Petiolate wormwood)

Distribution on the Forest: Lake Fork Canyon east of Moon Lake, Duchesne County, Utah and Death Valley, Daggett County.

Total Known Range: Same as above.

Habitat on the Forest: Red Pine Shale outcrops with curl-leaf mountain mahogany, manzanita, and ponderosa pine. This species is found in greater abundance where bare soil is greater than in adjacent areas where the species is not found.

Surveys: General botanical surveys associated with collections and vegetation studies including studies 3-13A1, 3-13B1, 3-13B2, 3-13B3, and 3-13B4.

Reaction to Disturbance: At Study 3-13B3 this plant was found in greater abundance in an old roadbed than in adjacent areas away from the road. Density of the plant was

observed to increase with increasing bare soil (Study 3-13B1).

Other Notes: This species is known from two populations on the Ashley National Forest. The population near Moon Lake appears to be dependent on disturbance that prevents woody species from forming dense stands. The population in Death Valley is on sandy soil with sparse cover of ponderosa pine, mountain big sagebrush, and other species. It appears competition from trees and dense shrubs could be detrimental to this plant. Management activities might be considered a potential risk as a constructed trail and a system road runs through the habitat. However, abundance of this species along the trail and the road appears equal to or greater than abundance away from the trail and the road.

The Death Valley, Daggett County population is represented by a collection (Goodrich 25376) made in 1995. Specimens of this number have been annotated as *A. c. var. scouleriana* and as *A. c. var. petiolata* by two different botanists. Collections from the Death Valley population in 2003 show a wide range in length of petioles for that population with the extremes placing the plants within the descriptions of the two varieties. This indicates tenuous separation of the two varieties. *A. c. var. petiolata* is treated as a synonym by Cronquist (1994). It is listed in synonymy by USDA, NRCS (2007).

Management Implications: Placing this plant on a list of plants of concern is inappropriate due to taxonomic disagreement and due to collections from Death Valley showing features attributed to two different varieties in the same population. I strongly recommend following Cronquist (1994) in reducing reduce this taxon to synonymy which will delete this from the plants of concern list. As indicated in table 1 this plant is not proposed as species of concern.

Also positive reaction to disturbance strongly indicates this plant is not appropriate for sensitive status.

Botrychium lineare W. H. Wagner (Slender moonwort, narrowleaf grapefern)

Distribution on the Forest: A single collection (R. S. Ferris sn of 5 July 1947) places this plant on or near to the Ashley National Forest on the Anthro Plateau Landtype Association at the summit of Indian Canyon, Duchesne-Price Road at 9,100 ft elevation.

Total Known Range: Western Mountains of the United States (Farrar 2002) in Washington, Idaho, Montana, Oregon, California, and Colorado (USDA, NRCS. 2007)

Habitat on the Forest: The location listed above suggests Douglas-fir, aspen, or shrub communities as potential habitat.

Surveys: The site of the location listed above was visited in 2004 by S. Goodrich and A. Huber (Ecologist, Ashley National Forest). No plants of slender moonwort were found.

The site was visited in 2003 by Don Farrar (Personal communication to Teresa Prendusi of 20 Feb. 2004 on file as Supervisors Office, Ashley National Forest, Vernal, UT). He noted “everything about this site seemed appropriate for *B. lineare* ... except the fact that it was so dry at that time”. It appears it would be best to visit the site in a wet year.

Reaction to Disturbance: Unknown

Management Implications: This plant is small and easily overlooked. It likely fails to produce above ground parts in some years. This will be a difficult plant to monitor. Level of information is insufficient to complete a credible assessment for the Ashley National Forest. As indicated in table 1 this plant is not proposed as species of concern.

Cypripedium fasciculatum Kellogg ex Wats. (Clustered ladyslipper, Brownie ladyslipper) (Last update: Feb. 2004)

Distribution on the Forest: Known in the Uinta Mountains (Daggett and Uintah Counties, UT) from the area covered by the following USGS 7.5 minute quads: Marsh Peak, Ice Cave Peak, Lake Mountain, Dyer Mountain, East Park Reservoir, Burnt Cabin Gorge, Mount Lena, and Elk Park. Known distribution is from east of Whiterocks Canyon on the south slope of the Uinta Mountains and east of Carter Creek on the north slope. Known from Parks Plateau and Trout Slope Landtype Associations. It is not expected on the Tavaputs Plateau. It is much less common west of the areas listed above in the Uinta Mountains. Considerable survey on the north slope of the Uinta Mountains west of Carter Creek has failed to produce locations for the plant in most areas. Small isolated populations have recently been found toward the west end of the Uinta Mountains outside the Ashley National Forest.

Total Known Range: Washington to Montana, south to California and Colorado.

Habitat on the Forest: Shade of coniferous forests. Although it has been found in spruce-fir communities, populations in this setting are few and small. Compared to size of populations of lodgepole pine forests, the relatively few and small populations of spruce-fir habitat indicated spruce-fir habitats to be marginal or comparatively poor habitat for this plant. Most frequent occurrences and larger populations on the Ashley National Forest are found in duff of moderately dense to dense lodgepole pine forests with most trees of 3-8 inch dbh where understory species are sparse and mostly limited to scattered plants of this species and a few others. These others include *Corallorhiza wisteriana*, *Calypso bulbosa*, and *Pyrola* spp. It is rarely found where grouse whortleberry (*Vaccinium scoparium*) or pinegrass (*Calamagrostis rubescens*) forms moderately dense to dense stands.

Known elevation is mostly from 8,000 to 9,000 (10,000) ft. Extensive survey indicates areas above 10,000 ft are not important for this plant species. There are many more populations of the plant in pole and prop sized lodgepole pine communities than in mature or old-growth mixed forests of the Ashley National Forest. It appears that trend

toward Engelmann spruce and especially toward subalpine fir dominated forests is not favorable for this species. Dense shade with limbs extending to near ground level appears to be a negative factor of subalpine fir stands.

Surveys: Several botanical specimens have been collected from the Ashley National Forest, and a formal survey was conducted as a challenge cost-share project and a report was completed (Franklin 1990A). Additional surveys of 2004, 2005, and 2006 indicate numerous plants in the Dyer Mountain-Brush Creek area and moderate sized populations elsewhere.

Reaction to Disturbance: Known to be greatly reduced and eliminated by fire (Deer Lodge Fire) and bark beetle epidemics that reduce coniferous shade and increase graminoid understory species. However, it is more abundant in lodgepole communities with moderate fire frequency than it is in mature or old-growth forests in areas with low fire frequency. In a population on Dyer Ridge, some plants are doing well on disturbance of a road cut. However, this is an exception. One of the larger known populations of this plant (Study 31-79) is in a mixed coniferous forest where lodgepole pine crown cover has been greatly reduced by mortality due to the mountain pine beetle epidemic of the 1980s. Brownie ladyslipper was found persisting in high numbers in this area of reduced shade in 1997. By 2004 there appeared to be fewer plants at this site. High presence of mature spruce and fir and strong regeneration of these species indicate the site will trend toward spruce and fir. Monitoring studies at this site will provide some opportunity to follow the influence of dense shade of spruce and fir compared to that of lodgepole pine.

Fire history of the habitat of this species includes large stand-replacing fires of intervals of 80-200 years. Although populations of this plant are reduced in the short-term by fire, long-term persistence of larger populations of this plant could be dependent on periodic fire that maintains lodgepole pine stands and prevents trend toward subalpine fir dominance.

At study site 43-41, this plant was found to be returning in a clearcut at 42 years post harvest. It is also found in a thicket of lodgepole pine regeneration following clearcutting at study site 19-42. The rate of return in the clearcut appears to approximate that found in burns. Where tree stands have been highly impacted by mountain pine beetle epidemics, the release of vigorous graminoids greatly suppresses or eliminates Clustered ladyslipper. Tree harvest in these areas can be expected to have comparatively little influence on the plant.

This plant grows where crown closure of trees is high enough to greatly limit forage production. The plant seems to do best where there is little more than a layer of pine-needle duff on the forest floor. Livestock tend to seek other areas for foraging. There appears to be little use of this plant or its specific habitat by livestock. It seems to be as abundant in areas with permitted livestock grazing as in areas with little or no livestock grazing.

Other Notes: This species has a large distribution compared to most plant species of

concern on the Ashley National Forest. However, concern for this species has been widespread in its range. It was formerly a candidate for listing under the Endangered Species Act and is currently a non-candidate category 3C species. It is regarded as a state-threatened or sensitive species in Idaho, Montana, Oregon, Washington, and Wyoming. It is on the California Native Plant Society's Watch List.

Management Implications: There are many populations of clustered ladyslipper in the eastern Uinta Mountains. Populations extend over a range of about 25 miles on both the north and south slopes of the mountains at the elevational band listed above. There are wide areas within this belt where the plant appears to be lacking (i.e. Alma Taylor Plateau). It is well dispersed in other areas (i.e. Little Brush Creek drainage).

Large populations and concentrations of populations should receive greater consideration for protection than isolated plants. This is consistent with the concept of "essential habitat" as outlined by Franklin (1990A). This concept can be applied with the current level of knowledge of the plant. Franklin (1990A) suggested following alternatives that protect few-plant occurrences. However, he also recognized that few-plant occurrences are perhaps expandable.

Number of populations and extent of area of the species, strongly indicates the species can be sustained through periodic fire. This is the indicated history of the plant. The return of clustered ladyslipper to harvested areas indicates the plant can be sustained with harvest as well as with fire. Where timber harvest is coordinated with distribution, abundance, and other features of populations of this plant, sustainability is highly likely. The number of populations and the extent of the area covered by the species, indicates the plant can be sustained on the Forest with loss of occasional few-plant occurrences.

Draba globosa Payson [*D. densifolia apiculata* (C. L. Hitch.) Welsh] (Pointed draba, Rockcress draba)

Distribution on the Forest: Alpine slopes and summits of Uinta Mountains on the Uinta Bollie Landtype Association.

Total Known Range: Idaho to Montana south to Utah and Colorado.

Habitat on the Forest: Alpine of Uinta Mountains where apparently most common in Uinta Bollie Landtype 3 (rounded summits and slopes near the crest of the range. Label data from recent collections indicate this plant is tolerant of snowbed conditions. More work is needed to determine the affinity of this plant for snowbeds.

Surveys: Huber (1995) and general botanical surveys have provided several locations for this plant in the Uinta Mountains. Collections show the plant is distributed across the entire alpine range of the Uinta Mountains from Murdock Mountain on the west to Leidy Peak on the east for a distance of about 60 miles. Collections so far indicate there are many small populations well distributed across the Uinta Mountains. Large populations

of the plant are apparently infrequent. However, this is a small, inconspicuous plant, and population size is likely larger than observations indicate. More work is needed to document population size in several areas where this plant has been found in the Uinta Mountains. Other populations are likely to be found.

Reaction to Disturbance: This is commonly found in disturbed, open ground of snowbeds. This indicates favorable reaction to factors that reduce cover of more aggressive plants. The very low, pulvinate-caespitose habit provides some protection from ungulate grazing. Most populations known on the Ashley National Forest are outside allotments where livestock are permitted to graze. Little effect to the plant is indicated from permitted grazing or wild ungulate browsing. On allotments where grazing is permitted, grazing is mostly confined to habitats other than that occupied by this plant. Vehicle travel has not been a factor at known locations of this plant in the Uinta Mountains. It is found in areas that have been closed to vehicle use.

Taxonomic Notes: Apparently Uinta Mountain plants were included in *Draba globose* by Payson (1917). *Draba globose* has been treated as a synonym of *D. densifolia* by Hitchcock (1941) and by Welsh et al. (1993). C. L. Hitchcock used one of Payson's specimens from the Uinta Mountains as the type for *D. apiculata*. Welsh et al. (1993) recognized *D. apiculata* as a weakly defined, arbitrarily separable, sympatric variant of *Draba densifolia*. In Holmgren et al. (2005) and in USDA, NRCS. (2007), *D. apiculata* is lumped under *Draba globose* which is distributed from Idaho to Montana and south to Utah and Colorado.

Management Implications: With many populations well dispersed across the alpine of the Uinta Mountains, this plant can be expected to be secure. It has persisted through a nearly a century of livestock grazing. With minor exceptions, permitted grazing in the area of this plant was confined to sheep. Numbers of sheep on the Ashley National Forest have been reduced from a high of 107,400 in 1934 to 9,700 in 2005. This represents about a 91% reduction in sheep use. Reductions of livestock and closure to livestock indicate little impact from livestock to this species.

There are local areas of high recreation use (mostly along trails) where there might be some impact from recreation. However, many populations of this plant are far removed from trails. Overall low impact is expected from recreation.

Mountain goats have recently occupied habitat of this plant. Impacts from this animal are yet to be seen.

Erigeron untermannii Welsh & Goodrich (Untermann fleabane, Untermann daisy)

Distribution on the Forest: Known from Lake Canyon-Right Fork Indian Canyon divide east to the divide between Sowers Canyon and Wire Fence Canyon in the central part of the South Unit of Duchesne District (West Tavaputs Plateau) on the area covered by the following USGS 7.5 minute Quadrangles: Gray Head Peak, Jones Hollow, Lance

Canyon, and Anthro Mountain. On the Ashley National Forest, this plant is known only from the Anthro Mountain Landtype Association.

Total Known Range: This plant is known only from Duchesne County, Utah with the bulk of the known populations on the Ashley National Forest in the vicinity described above.

Habitat on the Forest: Restricted to mixture of fine textured sandy-silty soil and flat, angular fragments that have weathered from the sandstone, shale, and siltstone that make up the Uinta Formation (Franklin 1989) and Green River Formation mostly on windswept, sparsely vegetated ridge tops (occasionally on side slopes) within the pinyon-juniper, Douglas-fir, and limber pine-bristle cone pine belts.

Surveys: Franklin (1989) conducted an intensive survey, established monitoring studies, and completed a report that includes distribution, essential habitat, and recommendations. Some locations have been documented by botanical collections by Forest Service botanists since the Franklin (1989) report. One of Franklin's monitoring sites was revisited in 2005. Results of the 2005 visit indicate a stable population for this site.

Reaction to Disturbance: This species is limited to areas subject to a high degree of natural erosion where competition from other plant species is greatly reduced. The plant is found on ridges heavily used by elk for winter range and on ridges lightly used by these animals. There appears to be little, if any, difference in vigor and abundance of this plant under light or heavy intensity of use by elk in winter. Most populations of the plant are highly protected from permitted livestock grazing by steep slopes and/or distance to water. Low growing forbs such as this one are not likely to be preferred by cattle for forage. Livestock use is limited to occasional trailing across this habitat. This habitat is inherently semibarren. Gravel and pavement often proved the principal ground cover on these sites. Occasional trailing by ungulates across the habitat of this plant is not likely to result in disturbance outside the range that is favored by this plant.

Exploration for oil and gas is increasing in the general area of this species.

Mentzelia goodrichii Thorne & Welsh (Goodrich blazingstar)

Distribution on the Forest: Anthro Plateau Landtype Association and perhaps the margin of the Avintaquin Canyon Landtype Association in Sowers Canyon and Avintaquin Canyon. In the Avintaquin drainage, this plant is known only from near Gray Head Peak at the far east of the drainage.

Total Known Range: Avintaquin, Argyle and Sowers Canyons, West Tavaputs Plateau, Duchesne County, Utah. Larger populations are known on Bureau of Land Management lands in Argyle Canyon than known on the National Forest.

Habitat on the Forest: Escarpments of Green River Formation and perhaps Uinta

Formation.

Surveys: Collections and some survey work. One population was discovered at a general monitoring site.

Reaction to Disturbance: This plant is known only from highly erosive escarpments where it appears well adapted to and perhaps dependent upon disturbance.

Management Implications: Known populations are highly protected from permitted livestock grazing by steep slopes, distance to water and by associated vegetation that is not attractive to livestock. Exploration for oil and gas is increasing in the general area of this species.

Papaver uintaense S. Welsh [*Papaver radicum* Rottb. (*P. radicum* ssp. *kluanense* (D. Love) D. F. Murray, var. *pygmaeum* (Rydb.) Welsh,] Papaveraceae Uinta poppy, alpine poppy.

Distribution on the Forest: Known from Uinta, Yellowstone, and Lake Fork drainages at the crest of the Uinta Mountains and around the heads of the drainages on the Uinta Bollie Landtype Association. It has been found near Mount Untermann at the head of the Carter Creek Drainage in Daggett County (Huber 960), and perhaps it might be expected in the Whiterocks and Rock Creek Drainages. Plants of the species have not been found at Leidy Peak or Marsh Peak after considerable botanical work has been done in these areas.

Total Known Range: Uinta poppy is known in the Uinta Mountains from Mt. Agassiz to Near Mt Untermann for a range of about 50 miles. This plant is similar to varieties of *Papaver radicum* which are widespread in arctic regions of North America and south to Colorado.

Habitat on the Forest: Talus slopes and windswept passes and saddles in Red Pine Shale and quartzite, from about 11,100-12,800 ft elevation on UB2 and less abundantly on UB1 of the Uinta Bollie Landtype Association. This plant is not expected elsewhere on the Forest.

Surveys: Several botanical surveys have been conducted on the Ashley National Forest for this species by Forest Service botanists. This includes the work of Huber (1995). A monitoring study (W20-23) is located at the crest of the Uinta Mountains astride the boundary of the Wasatch-Cache National Forest and the Ashley National Forest. Density count at this study site indicates 4015 plants/acre. However, the plant is essentially limited to only 1-2 acres at this site. Franklin (1990) conducted a survey and completed a report for the Wasatch-Cache National Forest.

Reaction to Disturbance: Plants of this species grow in scree slopes where colluvial action creates considerable natural disturbance. Most populations are fairly well

protected from most man-caused disturbance by the rocky, remote habitat. Trails dissect habitat of this plant where they cross over major passes such as Anderson Pass and Porcupine Pass. There is some potential to impact plants at these sites. However, relative area dissected by trails compared to the total distribution of the plant indicates trails and trailing are of overall minor influence.

Other Notes: This appears to be one of the more restricted and uncommon alpine plants of the Uinta Mountains. It is recorded for only about 15 sites on the Ashley National Forest, and it is not abundant at some sites. However, some collections represent populations that are spread over several to many acres. It is also known from a number of populations on the northslope of the Uinta Mountains on the Wasatch Cache National Forest. Franklin (1990B) listed 9 Element of Occurrence Records for the Wasatch Cache National Forest. Additional populations have been found since 1990.

This poppy appears to be frequently grazed by rock rabbits or pika (*Ochotona princeps*). The material from the Uinta Mountains is being studied by Dr. David F. Murray of University of Alaska, Fairbanks (Franklin 1991). Welsh in Welsh et al. (2003) recently described the material from the Uinta Mountains as a separate species.

Penstemon acaulis L. O. Williams Stemless beardtounge Scrophulariaceae

Distribution on the Forest: Daggett County from Lucerne Peninsula to Conner Basin on the North Flank Landtype Association.

Total Known Range: Daggett County, Utah and adjacent Sweetwater County, Wyoming (*P. a. var. acaulis*) and Moffat County, Colorado (*P. a. var. yampaensis*).

Habitat on the Forest: Mixed desert shrub, black sagebrush, Wyoming big sagebrush (rarely in well developed communities of this sagebrush), and pinyon-juniper communities.

Surveys: An intensive survey was conducted in 1991 as a cost share project between Ashley National Forest and Utah Natural Heritage Program. A detailed report (Franklin 1992) has been completed. Larger populations of the plant were found off the National Forest in that survey.

Reaction to Disturbance: *Penstemon acaulis* is found in greater abundance and greater vigor in occasionally used roadways than in areas adjacent to these roads at study sites 3-26A, B, C, and E, and 4-24D. Numerous plants of higher vigor than found in black sagebrush communities have also been found in a large gravel pit of very high degree of disturbance at study site 3-36D. This plant has colonized with vigor on disturbance by heavy equipment in construction of a communications facility west of Manila near study site 3-26. Density and size of plants on this disturbance is equal to or greater than that of plants in undisturbed habitat. Heavy disturbance without repeat follow-up disturbance is demonstrated to be highly compatible with this species. Reaction to repeat disturbance

might not be as favorable. The plant has persisted with livestock grazing in the South Valley area south of Manila. Stature of this plant indicates it is unlikely to be selected by livestock for forage.

Other Notes: Two taxa exist in the complex. These are *P. acaulis* (Pennell) var. *acaulis* and *P. a.* var. *yampaensis* (Pennell) Neese. The two taxa are quite distinct except in Browns Park near the Colorado/Utah line.

Thelesperma caespitosum Dorn (Green River Greenthread), and *Thelesperma pubescens* Dorn (Uinta greenthread) Asteraceae

Distribution on the Forest: Known from the Forest only from the extreme northeast corner of the Flaming Gorge National Recreation Area about 2 miles se. of the Town of Green River, Wyoming (Fertig 1995), and from the head of the Antelope drainage, West Tavaputs Plateau.

Total Known Range: Sweetwater County, Wyoming and Duchesne County, Utah. Known from T18N R106W S31 SE1/4 SE1/4 and S32 SW1/4 SW 1/4, about 4 miles south east of Green River, Wyoming. These locations border the Flaming Gorge National Recreation Area. Also known from about 5900 ft elevation in Indian Canyon, Duchesne County below the National Forest Boundary. Also known from the Bad Land Cliffs of the West Tavaputs Plateau where tens of thousands of plants of the species are known from several populations. 8200-8800 ft elevation

Habitat on the Forest: Badlands of Green River and Uinta Formations.

Surveys: Fertig (1995), conducted surveys and completed a report for this species in the Green River, Wyoming area. Surveys by Forest Service and other botanists have resulted in discovery of several populations in the Bad Land Cliffs. The populations in Indian Canyon, Duchesne County are known only by a few collections where extensive survey has not been conducted.

Reaction to Disturbance: Unknown, but grows on areas subject to high degree of natural disturbance.

Other Notes: For surveys in southwestern Wyoming, Fertig (1995) reported no evidence of grazing by sheep or cattle was detected. Of the thousands of plants seen in the Bad Lands Cliffs, there is little evidence of use of the habitat by domestic livestock. Evidence of wild ungulates is common in the habitat, but most of this use is apparently outside the growing season of this species. No threat to the viability of the species is apparent from wild or domestic ungulates. Exploration for oil and gas is increasing in the general area of this species.

TAXONOMIC NOTE: *Thelesperma pubescens* in a strict sense is limited to the Bishop Formation and perhaps adjacent areas in Uinta land Sweetwater Counties, Wyoming in

the Hickey Mountain area. This has been separated from *T. caespitosum* by pubescence of the leaves (Dorn 1972). With the discovery of mixed populations of plants with pubescent and glabrous leaves on the Tavaputs Plateau, the separation of the 2 taxa is perhaps tenuous. Difference in habitat indicates there might be features other than pubescence that might serve to separate these plants. Regardless of the taxonomic status of these plants, the distribution on the Ashley National Forest remains the same.

Management Implications: This plant appears little impacted by ungulate grazing including permitted livestock use. Some potential for impact is indicated by increasing levels of oil and gas exploration. Need for coordination of this activity with habitat of the plant could increase.